

## MEMORANDUM

**To:** Delaware EEAC  
**From:** Optimal Energy, EEAC Consultant  
**Date:** January 10, 2017, revised February 3, 2017  
**Subject:** Avoided costs for use in cost-effectiveness analysis

### SUMMARY

The EM&V subcommittee of the Delaware EEAC has engaged in several discussions regarding avoided costs for use in assessing the cost-effectiveness of energy efficiency measures and programs implemented by the Delaware utilities, DNREC, and the SEU. An initial recommendation for avoided costs was presented to the Council at the December meeting, but questions raised by those present resulted in further deliberations by the subcommittee and additional analysis by the Council's consultants. This memo summarizes the revised recommendation developed by the subcommittee at its meeting on January 10<sup>th</sup>.

### GENERAL APPROACH TO AVOIDED COSTS

To develop avoided costs in a timely manner to support energy efficiency plan submissions by Delaware utilities and other program administrator, the Council has relied on available data from relevant jurisdictions and public sources. The intent is to use these avoided costs only until such time as a Delaware-specific study can be completed. Until then, the Council believes that the approved avoided costs are sufficient to support decisions regarding the cost-effectiveness of efficiency measures, programs, and portfolios. It was determined to use a single state-wide set of avoided costs for electric energy and capacity to ensure consistency and comparability in program cost-effective results. The determination was also made to use specific natural gas avoided costs for each utility, due to the differences in gas supply cost and the relative simplicity of splitting the territory areas. The committee recommends that the avoided costs be applied for the 3-year planning period. This will provide program administrators with a more consistent basis for planning their programs. This memo is accompanied by a Microsoft Excel® workbook that details the sources and calculations for the avoided costs presented here.

### Gas Avoided Costs Calculation

Gas avoided costs are primarily based on each gas utility's gas service rate (GSR) or gas commodity rate (GCR). Based on conversations with both Chesapeake and DPL, this rate represents the avoidable marginal cost of supplying gas to customers. It includes the variable costs of gas transportation from the pipeline take-off point. It does not include fixed costs or other expenses that do not vary with the amount of gas supplied. These rates are also filed with the Public Service Commission.

Both Chesapeake and DPL provided the Council’s consultant with a workbook containing information on their filed GSR/GCR for 2016-2017 and the portion of that rate that represents prior year reconciliations and which are therefore deducted from the filed values to represent only the marginal cost of gas. Chesapeake has requested that this workbook remain confidential. Future years’ GSR/GCR is based on the projections for changes in gas prices in the Mid-Atlantic region developed by the Energy Information Administration (EIA).<sup>1</sup> Each utility’s base GSR/GCR was converted from units of million cubic feet (MCF) to million British thermal units (Btu) assuming a heat rate of 1.032 MMBtu per MCF.<sup>2</sup>

**Avoided Natural Gas (all usage)**

<b>Year</b>	<b>Chesapeake (2016\$ / MMBtu)</b>	<b>DPL (2016\$ / MMBtu)</b>
<b>2016</b>	7.77	4.26
<b>2017</b>	7.77	4.26
<b>2018</b>	7.82	4.29
<b>2019</b>	7.92	4.34
<b>2020</b>	8.09	4.43
<b>2021</b>	8.24	4.52
<b>2022</b>	8.40	4.60
<b>2023</b>	8.49	4.66
<b>2024</b>	8.56	4.69
<b>2025</b>	8.56	4.69
<b>2026</b>	8.54	4.69
<b>2027</b>	8.62	4.73
<b>2028</b>	8.73	4.79
<b>2029</b>	8.84	4.85
<b>2030</b>	8.92	4.89
<b>2031</b>	8.99	4.93
<b>2032</b>	9.06	4.97
<b>2033</b>	9.14	5.01
<b>2034</b>	9.21	5.05
<b>2035</b>	9.29	5.09
<b>2036</b>	9.36	5.13
<b>2037</b>	9.44	5.18
<b>2038</b>	9.52	5.22
<b>2039</b>	9.59	5.26

<sup>1</sup> EIA, Annual Energy Outlook, Table 3.2, Middle Atlantic Energy Prices, 2017

<sup>2</sup> Source: <https://www.eia.gov/tools/faqs/faq.cfm?id=45&t=8>

## Electric Avoided Costs Calculations

Avoided electric energy costs are based on values developed for the Maryland Energy Administration (MEA) for use by DPL in their Maryland service territory.<sup>3</sup> DPL's service territory in Maryland and Delaware together compose a single zone as defined by PJM, the regional system operator. We are using the reported avoided energy costs including a component for demand-reduction induced price effects, or DRIPE. To these avoided costs we have added the value of avoided Renewable Energy Credits (RECs) and Solar Renewable Energy Credits (SRECs) as defined by 26 Del. C. §§352(18) and (25). In 26 Del. C. §354(a) the requirement to acquire RECs and SRECs is tied to total state electric sales, reductions in sales from efficiency programs reduce the need to acquire RECs/SRECs.

Electric energy avoided costs in the MEA study are specified by energy period: winter on-peak and off-peak and summer on-peak and off-peak. To simplify the avoided costs into a single set of projections for each customer sector (i.e., residential or commercial), we developed a composite load shape of energy savings from efficiency measures based on the end-uses likely to represent a majority of energy savings. Avoided electric capacity costs are also based on the MEA study. Avoided capacity costs are composed of generating capacity, transmission and distribution capacity, and DRIPE.

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<sup>3</sup> Avoided Energy Costs in Maryland: Assessment of the Costs Avoided through Energy Efficiency and Conservation Measures in Maryland, Prepared by Exeter Associates for the Maryland Energy Administration, April 2014.

Year	Avoided Electric Energy		Avoided Electric Capacity
	Residential (2016\$ / MWh)	Commercial (2016\$ / MWh)	all users (2016\$ / kW)*
2016	68.61	76.17	110.36
2017	68.01	76.00	114.31
2018	66.00	73.07	115.08
2019	64.92	71.79	116.53
2020	63.90	70.28	118.57
2021	64.11	70.25	121.19
2022	65.19	71.19	124.30
2023	66.73	72.61	127.88
2024	67.39	73.22	131.92
2025	67.65	73.28	136.41
2026	68.59	74.07	141.34
2027	69.04	74.53	146.69
2028	69.91	75.26	152.47
2029	70.93	76.50	158.69
2030	70.77	76.07	165.35
2031	70.77	76.07	162.98
2032	70.77	76.07	162.98
2033	70.77	76.07	162.98
2034	70.77	76.07	162.98
2035	70.77	76.07	162.98
2036	70.77	76.07	162.98
2037	70.77	76.07	162.98
2038	70.77	76.07	162.98
2039	70.77	76.07	162.98

\* Avoided electric capacity to be applied to summer peak kW, as defined by PJM

## Formulae

Gas avoided cost = [(Utility GCR/GSR) – (prior year reconciliation)] x (EIA price escalator) x (MMBtu/MCF conversion)

Electric energy avoided cost = (avoided energy cost from MEA study) + (energy DRIPE from MEA study) + (value of avoided REC/SREC purchases)

Electric capacity avoided cost = (avoided capacity cost from MEA study\*) + (capacity DRIPE)

\* Avoided capacity cost from MEA study includes PJM capacity costs and transmission & distribution avoided capacity costs